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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,087	04/12/2004	Vincent K. Jones IV	021245-000310US	3166

20350 7590 02/07/2007
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EXAMINER

NGUYEN, TU X

ART UNIT	PAPER NUMBER
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2618

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/823,087

Applicant(s)

JONES ET AL.

Examiner

Tu X. Nguyen

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 60/462286.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 13-14, are rejected under 35 U.S.C. 102(e) as being anticipated by Klimovitch (US Pub. 2002/0111142).

Regarding claim 1, Klimovitch discloses a method for determining channel estimates at a receiver for a wireless communication system using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers, the method comprising:

receiving training signals from one or more receive antennas (see par.009);

computing an estimated channel impulse response from the received training signals by reference to a training sequence (see par.026-027); and

adaptively truncating the estimated channel impulse response in the time domain to improve the signal-to-noise ratio of the channel estimates (see par.013).

Regarding claim 14, Klimovitch discloses a method of channel estimation for a receiver of a multiple input, multiple output (MIMO) communication system wherein signals are transmitted using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers (see abstract), the method comprising:

receiving, at each of a plurality of receive antennas, training signals from a plurality of transmit antennas, wherein the signal from each transmit antenna includes a different subset of the plurality of OFDM subcarriers (see par.009);

transforming the received training signals at each receive antenna to a plurality of impulse coefficients for that receive antenna, each impulse coefficient corresponding to a different one of the OFDM subcarriers (see par.013); and

for each of the receive antennas, computing a channel impulse response for one of the transmit antennas using the impulse coefficients for the subset of the OFDM subcarriers transmitted by the one of the transmit antennas (see par.004).

Regarding claim 13, Klimovitch discloses the receiver includes a plurality of receive antennas and wherein the steps of receiving, computing, and adaptively truncating are performed for each of the receive antennas (see par.013).

Claims 25-26 and 28, are rejected under 35 U.S.C. 102(b) as being anticipated by Moose (US Pub. 2002/0065047).

Regarding claim 25, Moose discloses a method of tracking channel variations during receipt of a packet using one or more receive antennas, comprising:

determining an initial channel estimate from training data included in the packet (see par.009);

identifying a received symbol in the packet (see par.066);

estimating an input symbol value using the received symbol value and the initial channel estimate (see par.067-0108);

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deriving a per-symbol channel estimate from the received symbol value and the estimated input symbol value (see par.067-0108); and

updating the initial channel estimate using the per-symbol channel estimate (see par.039,043).

Regarding claim 26, Moose discloses updating the initial channel estimate includes applying a first order filter to the initial channel estimate and the per-symbol channel estimate (see par.021).

Regarding claim 28, Moose discloses the packet is transmitted using orthogonal frequency division multiplexing (OFDM) over a plurality of OFDM subcarriers and wherein channel variations are tracked for each of the OFDM subcarriers (see par.021).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being obvious over Klimovitch (US Pub. 2002/0111142) in view of Moose (US Pub. 2002/0065047).

Regarding claim 12, Klimovitch fails to disclose the receiver is configured to receive packets complying with IEEE 802.11a.

Moose discloses the receiver is configured to receive packets complying with IEEE 802.11a (see par.009). Therefore, It would have been obvious to one of ordinary skill in the art

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at the time the invention was made to modify the system of Klimovitch with the above teaching of Moose in order to provide a WLAN OFDM receiver as specified in the IEEE802.11a standard.

Claim 27 is rejected under 35 U.S.C. 103(a) as being obvious over Moose (US Pub. 2002/0065047) in view of Klimovitch (US Pub. 2002/0111142).

Regarding claim 27, Moose fails to disclose the packet is transmitted using a plurality of transmit antennas and received using a plurality of receive antennas, and wherein channel estimates are derived as a matrix for respective channels between each of the transmit antennas and each of the receive antennas.

In the related art, Klimovitch discloses the packet is transmitted using a plurality of transmit antennas and received using a plurality of receive antennas, and wherein channel estimates are derived as a matrix for respective channels between each of the transmit antennas and each of the receive antennas (see par.046). Therefore, It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Moose with the above teaching of Klimovitch in order to improving the bandwidth efficiency achieved by estimating MIMO channel characteristics by transmitting sequences simultaneously from a plurality of transmitting antennas.

Allowable Subject Matter

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Claims 2-20 and 15-23, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance:

Claims 2, 5 and 14 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu Nguyen whose telephone number is 571-272-7883.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



February 1, 2007